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ABSTRACT

In order to determine the predictive ability of the standardized scholastic tests used at Crowder College (CC) with regard to academic achievement, the first-quarter grade point averages (GPA's) of two groups of freshmen were compared with their scores on the American College Testing Program Examination (ACT) and the Missouri College Placement Test (MCPT). Additionally, the scores of the Crowder students were compared to those of University of Missouri freshmen and of a national sample. Only 8% of the freshman class took the MCPT, while 21% took the ACT. The average scores of the 110 CC students who took the ACT were consistently below those of the University of Missouri and the national populations. The scores of the 43 CC students who took the MCPT were significantly lower than the median test scores for students entering the University of Missouri on four of the five MCPT segments. When the correlation coefficients between the first semester grades and the ACT scores were calculated, the ACT sub-test and composite scores showed poor to moderate correlation with GPA, with the composite score providing the highest correlation and the ACT mathematics score having the lowest correlation. The MCPT did not show any signficant correlations at the .01 level with GPA. (AYC)

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THE ABILITY OF THE ACT AND MCPT TO PREDICT THE COLLEGE GRADE POINT AVERAGE

Crowder College

Neosho, Missouri 64850

Institutional Research Report 3-77

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JC 800 340

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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ABSTRACT

A portion of the freshman class that enrolled at Crowder College in Neosho, Missouri during the fall semester of 1976 was studied. The study population was comprised of those students who had taken the American College Test (ACT) or the Missouri College Placement Test (MCPT), and who then completed their first semester of college work. The purpose of the study was to determine the predictive ability of the various parts of the two scholastic ability tests towards academic achievement as measured by the first semester grade point average (GPA).

Each of the ACT segments showed a significant correlation with the first semester GPA. The ACT composite showed the greatest correlation while the ACT mathematics segment had the lowest correlation. A qualitative appraisal of poor to moderate could be applied in describing the predictive power of these tests. The values of the correlation coefficients were comparable to results that had been reported from a variety of institutions. None of the MCPT segments showed a significant correlation with the first semester GPA. Linear regression analysis produced significant linear fits for the ACT test score-GPA data.

In addition to the correlation studies, comparisons were made between the average ACT and MCPT scores of the Crowder College freshmen and their contemporaries at other institutions. The average ACT scores of the Crowder College students were significantly lower that the average scores of all students from the state of Missouri and of a national sample. Four of the five mean MCPT test scores for the Crowder freshmen were significantly lower than those of a comparitive group at the University of Missouri. The lower mean ACT

scores of the Crowder College students did not appear to carry over to markedly lower correlations with the first semester GPA. The four MCPT tests in which Crowder College freshmen exhibited significantly lower average scores than the comparitive group, were also the ones that had no significant correlation with the first semester GPA.

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I. Introduction

One part of the application procedure for new students at many colleges and universities in the United States is to take a standardized entrance examination. There are several basic types of these tests that are in general use: scholastic ability, achievement, personal and social adjustment, and special abilities. (Committee on Measurement and Evaluation, 1958, pp. 3-13) The most widely used tests are the scholastic ability tests. These tests attempt to predict academic success from verbal facility and quantitative reasoning. The tests are produced from problems based upon common experiences and school activities. Achievement tests are typically given after a program of study and are supposed to measure the actual proficiency that has been attained in defined areas of learning. These tests might concentrate on specific courses or they may be general tests over broad fields of learning. Interest tests reveal information about an individual's predominant interest patterns. Most of these tests deal with vocational matters. A fourth type of test is the personal and social adjustment test. These tests seek personal qualities that tend to be useful for the determination of long term goals. The final type is the test of special abilities and aptitudes. These tests have been designed to examine mental as well as physical characteristics that are required for specific academic or vocational activities.

Whichever type of test is utilized, its ultimate purpose is to aid the three segments of the post-secondary community; student, faculty, and administration. Entrance tests can be an invaluable counseling aid for students. They can be directed into the proper programs and have undeveloped skills identified. The instructional staff utilizes tests to insure that student aptitudes are right for a given course or even for an entire program in the case of selective admission institutions. The administration is also interested in insuring that the students and curricula are compatible. And, in a more

general sense, in determining whether or not current offerings fulfill the stated academic aims of the institution.

The purpose of this paper is to take one of the basic types of tests, the scholastic ability test, and then to examine another area for which use of this test might be made. Namely, the prediction of academic achievement based upon scholastic ability test results. A brief review will be made of how this usage has been carried out on a nation-wide basis. Then, results of a study based upon students enrolled at Crowder College in Neosho, Missouri will be reported.

There are two major scholastic ability tests that are currently employed on a national basis and a host of tests that are used in various locales or for particular types of institutions. The primary national tests are the Scholastic Aptitude Test (SAT) and the American College Test (ACT). The SAT is an older test series that is administered by the College Entrance Examination Board. Use of this test tends to be concentrated among eastern schools. The ACT is a newer test that is administered by the American College Testing Program. The ACT tends to be concentrated among western and midwestern campuses. In the state of Missouri, the ACT is utilized by a majority of colleges and universities. A second battery of tests had been important in the state, but they are now used on a reduced scale. These tests are the Missouri College Placement Tests (MCPT), which are administered by the University of Missouri.

The SAT is composed of two parts, verbal and mathematics, and a total. the ACT is composed of four parts and an average composite score. The subtests are english, mathematics, natural science, and social studies. The MCPT also has four main parts. One half of the test is the School and College Ability Test - Series II (SCAT-II) which has verbal and quantitative sections and a total score. The other parts of the MCPT are the Missouri College

English Test (MCET) and the Missouri Mathematics Placement Test (MMPT).

Crowder College utilizes entrance test scores as a placement tool for freshman students. The tests are not obligatory, only recommendatory. As a consequence, a majority, approximately two-thirds, of the entering freshmen at Crowder College will not have taken any entrance test. For these students, class placement is based upon high school or general educational development background. Most of the students at Crowder College who have taken entrance tests have participated in the ACT program. For a minority of students who have neither a recent high school or high school equivalent background nor ACT results on file, the MCPT is given by the college at no cost to the student.

These then are the subjects of the study. The question that is now to be addressed is, how effective are scholastic ability tests as predictors of course grades or the freshman grade point average? A review of the literature shows that the results are mixed. Many statistical techniques have been brought to bear on this problem. Simple correlations between single test scores and grades, multiple correlations between several predictors and grades, comparisons between average group test scores and average group grades - and the list goes on. Let us examine some of the overall results for the SAT, the ACT, and the MCPT as predictors of academic achievement.

The SAT is not used a great deal in this part of the country, and it has not been used at all at Crowder College. However, it is used at many institutions throughout the nation, therefore, it is important that examination and comparison be made between the SAT and those tests that are utilized locally. One article showed that the SAT exhibited poor to moderate correlation with GPA (Larson and Scontrino, 1976). At a small west coast university, the correlation coefficient between the SAT verbal test and GPA ranged from a low of .40 to a high of .58. The correlation coefficient

between the SAT mathematics test and GPA ranged from a low of .22 to a high of .53. It has been reported that multiple correlations involving high school grades and tests scores appeared to serve as better predictors of GPA (Fincher, 1974; Larson and Scontrino, 1976; and Chissom and Lanier, 1975). In each case, the high school GPA served as a better single predictor of college GPA than did the individual parts of the SAT. Carrying the process one step further, "SAT scores, high school rank, and a high or low achievement average were used to derive a formula to adequately predict freshman grades" (Wilson, 1971). The SAT has achieved a small degree of success in predicting individual course grades (Chissom and Lanier, 1975 and Gusset, 1974).

On the other side of the coin, the literature has included cases where the SAT did not provide adequate grade predictability. A study from the University of North Carolina showed that there was little freshman course grade predictability from any of the SAT categories (Pederson, 1975). A long term trend toward lower predictive validity in the college freshman GPA by the combined high school GPA and SAT scores has also been noted. In one study, females seemed to be more predictable than males, but neither showed significant correlations (Dalton, 1976).

As was stated earlier, the ACT is utilized primarily in the midwest. The utilization of the ACT as a course grade predictor or as a freshman GPA predictor was found to have approximately the same degree of success as did the SAT. The combination of ACT scores and high school grades appeared to have a moderate predictability towards the GPA (Price and Kim, 1976; Baird, 1969; and Hoyt, 1968). In most cases, the high school grades tended to act as better predictors than did the ACT sub-tests. The multiple correlation coefficients were reported to be in the range of .5 to .8. In the three studies cited above, no particular ACT sub-test consistently showed a better correlation with the freshman GPA.

An interesting side note is that particular types of populations have at times shown greater correlations than other types. One study (Merritt, 1972) reported on workstudy students. The ACT composite for this group showed a correlation of .71 with the freshman GPA, significantly higher than any other results that have been reported. Yet, other studies concerned with two-year college students in general have not shown similar results. Two-year colleges are mentioned in particular since they tend to have larger populations of lower socio-economic clientele. High school juniors who took the ACT tended to be better predictors than high school seniors (Maxey and Ferguson, 1976). And, the ACT composite scores were shown to be effective predictors for Caucasian students, whether disadvantaged or not (Pedrini and Pedrini, 1976).

Like the SAT, the ACT also tended to break down in terms of its predictive ability. Even though white students showed a significant correlation, this did not carry over to minorities such as blacks (Pedrini and Pedrini, 1976). The literature also showed that the ACT sub-tests did not show a significant correlation with course grades (Nolan, 1977 and Decker, 1974).

The results mentioned here-to-fore have dealt with the ACT or SAT separately. The question can be asked whether one of the tests might be better than the other as a freshman GPA predictor when they are compared directly. Several studies have looked at this matter. One study was done on a varied group of seventeen colleges and universities from 1968-69 to 1970-71 (Lenning and Maxey, 1973). The study showed that the ACT provided freshman GPA correlations that were noticeably higher for more than half of the institutions and approximately the same for the other half. The study also showed that when the accuracy of prediction was low for one test battery, it was generally low for the other as well. Another paper (Maxey and Lenning, 1974) provided additional input regarding the above statements. In a second group of ten colleges, it was found that the ACT composite provided better

correlations than the SAT total by a six to four ratio. The individual college correlations for the ACT composite ranged from .234 to .492 while the individual correlations for the SAT total ranged from .214 to .501. The correlations for the two tests were quite close. However, when all of the students from the ten schools were taken together, the ACT composite was moderately higher than the SAT total, .364 compared to .321. Other studies have shown that the ACT and SAT yielded similar predictive results at highly selective institutions (Lenning, 1975 and Adams, 1976).

Finally, what can be said about the MCPT as a GPA predictor? Like the SAT and ACT, this test battery also showed poor to moderate correlation with the freshman GPA (Willis and Nicholson, 1970). The correlations between the test scores for the 1968 freshmen at the University of Missouri and their GPA ranged from a low of .27 for the MCET part of the test to a high of .38 for the SCAT-II total scores.

Since the predictive ability of the ACT and MCPT will be examined for the 1976 freshman class at Crowder College, it would be well to first examine some of the characteristics of these students. Institutional research that has been carried out at the college (Schade, 1976) showed that the students who enrolled had a varied range of academic abilities and interests. A large majority of the students represented the first generation of their family who attended college. As such, many of the students would have to be considered to be from a lower socio-economic stratum. Reported family incomes tended to support this conclusion. As a result of the low family incomes among a majority of students at the institution, a very large majority of students had outside jobs in addition to their studies. The large majority of students studied here were recent high school graduates, approximately 18 to 20 years of age. This was not a common attribute of students who were enrolled at Crowder at the time, as a majority of the total enrollment were

25 years of age or older. However, the other characteristics mentioned would be common to the study group.

II. The Statistical Methodology

Data were available for two sub-groups of the 532 freshman students who enrolled at Crowder College during the fall semester of 1976. Only those students who had ACT or MCPT results on file and who had completed the fall semester were examined in this study. One hundred ten students, 21% of the entering freshman class, took the ACT battery and completed the first semester. Forty three students, 8% of the freshman class, took the MCPT battery and completed the first semester. A very small percentage of the students who took either test failed to complete the first semester of college work. Therefore, it can be seen that a large majority of the 1976 freshmen did not take either test. The ACT tests were taken in high school and were scored by the American College Testing Program in Iowa City, Iowa. Results were sent to the various institutions chosen by the students when they took the tests. The MCPT tests were given during the fall college registration. These tests were scored by Crowder College personnel. Entrance examination results and college transcripts were kept on file in the Registrar's Office at the college.

Entrance examination scores were compared between the freshmen who enrolled at Crowder College during the fall of 1976 and their contemporaries at other institutions. These comparisons were included to help place the test score - grade point average correlations in perspective. Table I provides the mean values and standard deviations for the ACT sub-tests and composite. The ACT results for Crowder students (American College Test Program, "Crowder College; Enrolled 1976-77 Freshmen," 1977) were compared with students on the national level (American College Test Program, "National Norms, a 10% sample," 1977) and with students on the state level (American College Test Program, "Missouri State Composite," 1976). It will be noted that the number of local

students reported in these tabulations is slightly lower than the number used in the rest of the study. A search of the student records had turned up additional names that were added to those of the 1976-77 ACT local enrollment report. Table II provides the means and standard deviations of the MCPT sub-tests. Normalization had to be made with 1973-74 state-wide median scores. Current data were not available from the University of Missouri. It was felt that the later median scores would be more meaningful than the 1968-69 normative data (Willis and Nicholson, 1970) that was found in the literature.

The computations that were required for the correlation coefficients and linear regression analyses were performed on a Hewlett-Packard 9820-A programmable calculator. The program that was written required successive input of the independent and dependent data. The correlation coefficients for the data pairs, the value of the R^2 percentage, and the degrees of freedom were printed as output. If desired, the slope and intercept of the regression line and the test of significance for the regression line could also be printed as output. A listing of this program is provided in Appendix II.

The results of the correlation study between the ACT sub-tests and composite and the first semester grade point average (GPA) are shown in Table III. For each part of the ACT, the correlation coefficient, R, the value of the R^2 percentage, and the degrees of freedom were shown. The value of R is a measure of the degree to which changes in the independent variable, the test scores, are associated with changes in the dependent variable, the GPA. The R^2 value indicates the percentage of the total variability in the data that is accounted for by a functional relationship between the variables. The remaining variation is associated with statistical error or untested factors. (Rickmers and Todd, 1967, pp. 264-266). The level of significance was chosen to be .01. The results of the correlation study between the MCPT sub-tests

and the first semester grade point average are shown in Table IV. The format of this table is similar to that of Table III.

The ACT sub-tests showed a significant correlation with the grade point average at the .01 level. Therefore, linear regression analysis was performed on these data. The results were shown in Table V. The slope and intercept of the regression line for each test was shown. The slope indicates the amount that the GPA should increase (a positive slope) with each incremental increase in the ACT sub-test or composite score. The intercept represents the expected GPA if the ACT sub-test or composite score were zero. An analysis of variance test was performed to check for the significance of the regression line. The residual and regressional degrees of freedom and the F ratio were the results that came from this test. Again, a significance level of .01 was chosen.

III. The Analysis of Results

As shown in Table I, the average scores of the 1976-77 Crowder College freshmen who took the ACT were consistently below those of the Missouri and national populations. In each sub-test and with the composite results, there was an approximate three point differential between the Crowder scores and those of the other two groups. Statistical tests showed that for each sub-test and for the composite at a significance level of .01, there were significant differences between the average scores of the Crowder students and the average scores of the Missouri and national groups. The Missouri scores and the national norms were sufficiently close to assume that there was probably no significant difference between those groups.

In each of the three student groups, the natural science sub-test had the highest mean score. For the Missouri and the national groups, there was a three point drop to the other three tests which showed almost identical average scores. The Crowder group showed a slightly different symmetry in that the english mean score was a little larger than the mathematics and social studies average scores.

As was stated earlier, current MCPT normative data were not available from the University of Missouri. The 1973-74 percentile data were being used by Crowder, and median scores could be taken from these data. If a normal distribution could be assumed, the median and the mean were, of course, equal. It can be seen from Table II, that in four parts of the MCPT, there were large differences between the 1976-77 Crowder College averages and the 1973-74 median scores for the University of Missouri system. In each of these tests, the average scores of the Crowder students were significantly below the median scores. The MMPT test average for the Crowder students was slightly higher than the median score for the comparative group. However,

Table I

ACT Average Scores for 1976-77 Enrolled Freshmen:
Crowder College, Missouri Composite and National Norms

Test	Crowder College N = 95 Mean	S.D.	Missouri Composite N = 21,357 Mean	S.D.	National Norms N = 48,808 Mean	S.D.
English	15.7	5.1	18.2	5.1	17.6	5.4
Mathematics	14.3	6.3	18.1	7.4	17.8	7.8
Social Studies	14.6	6.5	18.1	7.2	17.4	7.5
Natural Science	18.3	5.6	21.4	6.4	20.9	6.6
Composite	15.9	4.7	19.1	5.6	18.5	6.0

Table II

MCPT Average Scores for 1976-77 Enrolled Freshmen at Crowder College
and MCPT Median Scores for 1973-74 Enrolled Freshmen in the
University of Missouri System

Test	Crowder College (1976-77) N = 37 Mean	S.D.	Missouri University (1973-74) N = 8890 Median
MCET	29.2	16.0	56.5
MMPT	19.0	15.3	17
SCAT Verbal	19.8	6.2	25
SCAT Quantitative	15.2	5.5	25
SCAT Total	34.9	9.9	51.5

the difference was not great enough to be significant at the .01 level.

Normative data for a 10% sample of the 1968-69 freshman class at the University of Missouri were available from the literature (Willis and Nicholson, 1970). The means and standard deviations for this group's MCPT results were as follows: MCET, 55.6 $\pm$ 16.4; MMPT, 18.7 $\pm$ 6.9; SCAT verbal, 27.2 $\pm$ 7.8; SCAT quantitative, 25.4 $\pm$ 8.0; and SCAT total, 52.6 $\pm$ 13.5. Crowder College freshmen scored significantly below the 1968-69 group in four parts of the MCPT. In the MMPT segment, there was no significant difference between the 1976-77 Crowder group and the 1968-69 University of Missouri sample.

An interesting tangential note can be made in comparing the 1973-74 University of Missouri median scores with the 1968-69 university mean scores. In one test, the MCET, the 1973-74 median was slightly greater than the 1968-69 average. However, the difference was not significant at the .01 level. In the other four tests, the 1973-74 median scores were significantly different from the 1968-69 averages. In each case, the 1973-74 medians were less than the average scores from five years earlier. The interesting question that can be asked is whether or not this represents a trend in declining test scores? The answer to this question is beyond the scope of this paper and will not be pursued further.

The next two tables show the results of the correlation coefficient computations. It can be seen in Table III that each of the ACT sub-tests and the composite showed a significant correlation with the first semester freshman grade point average. The best GPA predictor was the composite (r=.465), followed by english (r=.425), social studies (r=.394), natural science (r=.355), and mathematics (r=.353). The predictive ability of these tests towards the first semester GPA could be qualitatively classified as poor to moderate. The R^2 percentage results were in the range of 12.5% for the mathematics sub-

Table III

Correlations Between the ACT and First Semester Grade Point Average

N = 110

Test	R	R^2 %	Significant Correlation (α=.01)
English	.425	18.0	Yes
Mathematics	.353	12.5	Yes
Social Studies	.394	15.5	Yes
Natural Science	.355	12.6	Yes
Composite	.465	21.6	Yes

Table IV

Correlations Between the MCPT and First Semester Grade Point Average

N = 43

Test	R	R^2 %	Significant Correlation (α=.01)
MCET	-.162	2.63	No
MMPT	.329	10.8	No
SCAT - II			
Verbal	.179	3.20	No
Quantitative	.201	4.05	No
Total	.225	5.04	No

tests to 21.6% for the composite. This means that even with the best GPA predictor, the composite, only 21.6% of the total variability in the data could be accounted for by a relationship between the composite score and the first semester freshman grade point average. The remainder of the variability, 78.4%, was associated with statistical error or untested factors. These correlation coefficients were in line with results that were found in the literature. Reported values for the ACT composite-freshman GPA correlation ranged from a low of r=.234 at one college to a high of r=.492 at another college (Maxey and Lenning, 1974). The average correlation coefficients for the ACT sub-tests were found to be in the approximate range of .3 to .4. Typically combinations of predictors, such as several sub-tests or sub-tests and high school grade point average, appeared to give only slightly higher correlations with the freshman grade point average.

Table IV shows the results of the correlational study between the MCPT segments and the first semester GPA. There were no significant correlations between the various segments of the MCPT and GPA. The highest correlation coefficient was found between the MMPT and GPA (r=.329). This was comparable to the best result (r=.32) reported in the literature for the 1968-69 sample of University of Missouri freshmen (Willis and Nicholson, 1970). However, the correlation coefficient for the Crowder College students was based upon a sample size of 43 students. This was an insufficient population for the calculated correlation coefficient to be significant at the .01 level.

Once the predictive ability of a particular test was established, a linear functional relationship between the predictor variable and first semester GPA was sought. Scatter diagrams were plotted for each of the ACT sub-tests and composite. From these diagrams, it was seen that the unaccounted for variability, i.e. $1-r^2$, was not due to readily apparent non-linear relationships between the ACT scores and the GPA. Therefore, linear regression

analysis was performed on these data. The slope, intercept, and test of statistical significance of each linear relation are shown in Table V. These results are listed in the table in order of decreasing values of the correlation coefficient. That is, starting with the best predictor, the composite, and ending with the poorest predictor, the mathematics sub-test.

Using the fitted slopes and intercepts from Table V, it was then possible to generate a table of predicted first semester grade point averages based upon the individual ACT sub-test and composite scores. These combined tables are included as Appendix I. The predicted GPA for two of the test scores were not included in the appendix. When a raw score of 36 was used in the composite and english predictive equations, the predicted GPA was greater than 4.00. A GPA of 4.00 represents a perfect "A" average and cannot be exceeded. Statistically significant linear functions were fit to the data. However, these linear functions were not necessarily the best relations to fit. Although not apparent from the scatter diagrams, perhaps other mathematical functions would have given a better data fit.

Be that as it may, let us study one example of the best GPA predictor, the ACT composite regression equation. The predictor equation was:

$$GPA = 1.78 + .070\ C,$$

where C is the ACT composite score and GPA represents the predicted first semester grade point average. The average composite score for the 1976-77 freshman class at Crowder was 15.9. Taking the closest ACT score to that, C=16, and substituting the value into the equation, the predicted GPA would then be 2.90. Six of the 1976-77 freshmen had ACT composite scores of 16. Their actual first semester GPA's ranged from 2.00 to 3.60, with a group average of 2.76. Four (67%) of the group's GPA's were within 12% of the predicted GPA. Therefore, it does appear that a linear predictive mode works to at least a first approximation in fitting the data that generated it.

Table V

Linear Regression Analysis for The Tests Showing a Significant Correlation with the First Semester Grade Point Average

	Linear Regression Analysis		Analysis of Variance			
	Slope	Intercept	Degrees of Freedom Regression	Residual	F Ratio	Significant (α=.01)
ACT Composite	.070	1.78	1	108	29.8	Yes
ACT English	.062	1.92	1	108	23.8	Yes
ACT Social Science	.045	2.24	1	108	19.9	Yes
ACT Natural Science	.049	1.99	1	108	15.5	Yes
ACT Mathematics	.038	2.36	1	108	15.4	Yes

To refine the technique in the future, perhaps consideration could be given to devising a functional relation that is linear in the middle but curvilinear at the extremes. It would also be of interest to examine the utilization of the predictor equations for groups other than those who generated them, i.e. 1975-76 or 1977-78 freshmen.

A final question that will be pursued is, why do the scholastic ability tests such as the ACT and MCPT fail to predict academic achievement as measured by grades and rade point averages in a really adequate manner? It would appear eminently reasonable to expect that high achievers on these tests would also be high achievers in terms of grades, and that the converse would also be true. In many instances, these correlations were seen. However, there were also a sufficiently high number of instances in which there were no correlations between test scores and measured academic achievement, thereby producing the nil to moderate results that have been reported in the literature and in this study. In other words, how do we explain the student that barely makes satisfactory grades, yet who ranked in the 99th percentile on a scholastic ability test; or the student who ranked in the lower decile on a test and turns out to be a 4.00 student in college?

The most optimistic viewpoint, and one that is to some extent valid, is that college and university work can motivate and 'turn on' a student who was not motivated in high school. Hopefully, this new motivation would carry over to better grades. This particular aspect will be seen often in a post-secondary environment where students can encounter vocational programs that arouse their interests. The opposite case can also be found, where college work actually stifles earlier high school motivation. In the two instances mentioned, there will possibly be poor performance and then good performance from the same student just because the level of motivation has changed.

In addition to changes in motivation, there are two other areas that can be examined, the grading system and the scholastic ability tests. A major problem always associated with grades has been a lack of standardization (Goldman and Slaughter, 1976). Among the many teachers, areas of study, and institutions, there are a plethora of grading standards. A student who achieves at a certain level in one class should be expected to achieve at approximately the same level in other classes. Yet this does not always happen. If students were to take the same course from different teachers, whether at the same or at a different institution, they would not necessarily make the same grades. Different academic areas will tend to have different standards. Some disciplines are notoriously stringent and demanding while others are the opposite. Compounding this difficulty is the fact that lower ability students will tend to gravitate towards those areas that are less taxing. The scholastic ability tests can also be suspect. As was stated earlier, the purpose of these tests is to predict academic success from verbal facility and quantitative reasoning. Yet it is impossible to determine what a low score actually implies. A low score might indicate insufficient native capacity or it might show that there has been inadequate training in the skills and abilities that are being tested (Committee on Measurement and Evaluation, 1959). In the latter case, proper training might produce a better grade point average than that indicated by the test score. Questions have also arisen regarding built in test bias. These biases could be cultural (i.e. racial, sexual, economic, etc.) or academic. Academic bias would result if the test was not designed to measure the potentials actually needed for a particular field of endeavor.

Therefore, we have seen several reasons why grades and grade point averages are not predicted well from scholastic ability test scores. The students tend to change between the testing time and the end of their first semester. The

tests may not actually ask the 'right' questions. And, finally, the grading standards are not standardized sufficiently. Yet, as was seen in this study and in other studies reviewed from the literature, there has been a sufficient amount of success to encourage further tries and refinement in the methodology of this area.

IV. The Summary and Conclusion

In summarizing the literature findings, scholastic ability test scores, taken individually, have shown at best only moderate predictive ability towards freshman grade point averages. Typically, there had been few correlations reported between test scores and individual course grades. The ACT battery seemed to show slightly better correlations than did the SAT battery when they were compared directly. There were no apparent student groups, such as racial, socio-economic, etc., that consistently reported either a correlation or a lack of correlation between the variables that were of interest in this study.

A statistical study was performed on some of the freshman students who enrolled at Crowder College in Neosho, Missouri during the fall of 1976. The purpose of the study was to determine the predictive ability of the standardized scholastic ability tests towards the first semester grade point average. Two scholastic ability tests were used at Crowder during the 1976-77 academic year; the ACT and the MCPT. Twenty one percent of the freshman class took the ACT and finished one semester of college. Eight percent of the freshmen took the MCPT and finished one semester. The Crowder students who took the ACT series had average scores significantly lower on each of the sub-tests and composite than did their contemporaries on the state level or on the national level. The Crowder students who took the MCPT series had average scores on four parts that were lower than the median scores of a University of Missouri comparative group. One part of the MCPT, the MMPT, showed comparable results between the two groups.

In order to test the predictive ability of the entrance tests towards academic achievement, the correlation coefficients between the first semester freshman grade point average and the individual sub-tests of the ACT and MCPT

were calculated. The ACT sub-tests and composite showed poor to moderate correlations with GPA. The correlation coefficients were statistically significant at the .01 level. The values of the correlation coefficients and the attendant value of the r^2 percentage (in parentheses) were: english, r = .425 (18.0%); mathematics, r = .353 (12.5%); social studies, r = .394 (15.5%); natural science, r = .355 (12.6%); and composite, r = .465 (21.6%). As can be seen, the ACT composite provided the best correlation with the first semester GPA. These values of the correlation coefficients were comparable to similar studies that had been found in the literature.

The MCPT did not show any significant correlations at the .01 level. One test, the MMPT, showed comparable results to a 1968-69 study at the University of Missouri. However, the small size in this study precluded the value of the correlation coefficient from being significant.

Linear regression analysis was performed on the first semester GPA-ACT sub-tests and composite score data pairs. Five statistically significant linear predictor equations were obtained from these data. Based upon these equations, a table of first semester grade point averages, as predicted from ACT sub-test scores or the composite score, was generated.

Three basic reasons were explored to try to explain the marginal predictive ability of scholastic ability tests. The tests themselves may not be properly formulated for typical students at a comprehensive community college. Many of these students may not have the high school training implied in these tests, but do have native ability. Or, their potentials might be in areas other than those tested. The item being predicted, college grade point average, is subject to many interpretations in its determination. Because of a lack of standardization, a great deal of subjectivity is inherent in a supposedly objective measure, the quantitative measure of academic achievement. Finally, a student's motivation does tend to change. If the student can be properly

motivated, it can result in better performance than was predicted. The converse of the above statement is also true, of course.

It is recommended that continued utilization be made of the ACT at Crowder College. The test has shown indications of being an adequate counseling tool in many cases. It has not served as a good predictor of specific course performance, but it did seem to serve as a moderate predictor of over-all academic achievement. Secondary utilization of the ACT lies in its interest inventories and outreach aspects for college recruiting purposes. It is felt that a more extensive data base and additional analysis could serve to provide greater predictive power from this test battery. On the other hand, it is recommended that use of the MCPT be discontinued at Crowder College. It does not appear to provide adequate predictive power in terms of individual courses or in terms of individual grade point averages. Also, when the small number of students who take the test is considered, it would not appear to warrant the time and expense that is spent. It is felt that it would be more beneficial to search for a new battery of tests that are more atuned to typical community college students. Then, a concentrated effort should be made to insure that a greater number of students participate in these tests. The tests serve no purpose if they are not adequately utilized.

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Appendix I

Prediction of Crowder College Grade Point Average

Based Upon ACT Results

ACT Raw Score	ACT Sub-Test				
	English	Mathematics	Social Studies	Natural Science	Composite
6	2.30	2.59	2.51	2.28	2.20
12	2.67	2.82	2.78	2.57	2.62
18	3.05	3.05	3.05	2.86	3.04
24	3.42	3.27	3.32	3.15	3.46
30	3.80	3.50	3.59	3.45	3.88
36	-	3.73	3.86	3.74	-

Appendix II

Correlation Coefficient and Linear Regression Analysis Computer Program (HP Language)

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0: Prt "Data Points", "Abscissa (X)", "Ordinate (Y)"; Spc 2├
1: Fxd 4;5→A;0→R0→R1→R2→R3→X→Y├
2: Ent "Abscissa (X)", R(2A); If R(2A) = 1E99; GTO 8 ├
3: Ent "Ordinate (Y)", R(2A+1); Prt R(2A), R(2A+1); SPC├
4: R(2A) + X→X; R(2A+1)+Y→Y├
5: R(2A)↑2→Z; Z+R1→R1; R(2A+1)↑2→Z; Z+R2→R2; R(2A)*R(2A+1)→Z; Z+R3→R3├
6: R0+1→R0; A+1→A├
7: GTO 2├
8: (R3-XY/R0)/√((R1-X↑2/R0) (R2-Y↑2/R0))→R4├
9: PRT "Correlation", "Coefficient"; Spc; Prt "R=", R4, "R Square %"├
10: Prt 100R4↑2; Spc 2; R0-2→R5; Fxd 0├
11: Prt "Degrees of", "Freedom"; Spc 1; Prt "DF=", R5; Spc; Fxd 4├
12: Prt "Linear", "Regression", "Analysis"; Spc 1; Prt "Y=AX+B"; SPC 1├
13: (R3-XY/R0)/(R1-X↑2/R0)→R6├
14: Y/R0-R6X/R0→R7├
15: Prt "Slope A =", R6; Prt "Intercept B=", R7; SPC 2├
16: Ent "Ent 1 for a OV", Z; If Z=1; GTO 24├
17: Ent "Ent 1 for Predct", Z; If Z=1; Jmp 2├
18: GTO 29├
19: Spc 8; Ent "Predictor", R8, "Increment", R9, "No. Increments", B; 1→Z├
20: Prt "Predictor (X)", "Ordinate (Y)"; Spc├
21: R6R8+R7→C; Prt R8, C; Spc├
22: If B>Z; Z+1→Z; R8+R9→R8; GTO 21├
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23: GTO 29┤
24: Prt  "Analysis of", "Variance";  Spc 2┤
25: Fxd 0; Prt "Degrees of", "Freedom"; Spc; Prt "DF Regression", Z┤
26: Prt "DF Residual", RO-2; Fxd 4; Spc; R1-XX/RO→R10; R2-YY/RO→R11┤
27: R3-XY/RO→R12; R12↑2/R10→R13; (R11-R13)/(RO-2)→R14┤
28: R13/R14→R15; Prt "Fratio", R15; Spc 2; GTO 17┤
29: SPC 8; End┤
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